State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES
6 Hazen Drive, P.O. Box 95, Concord, NH 03302-0095
(603) 271-3406 FAX (603) 271-7894

August 6, 2003
Letter of Deficiency
DSP#03-042

Mr. Tom Cravens
Portsmouth Water Works
680 Peverly Hill Road
Portsmouth, NH 03801-5356

RE: Bellamy Reservoir Dam #148.13, Madbury

Dear Mr. Cravens:

The Department of Environmental Services, Dam Bureau (DES) consistently strives to enhance the safety of dams in New Hampshire through its dam safety program. One of the many instruments that play a part in reaching this goal is our inspection program. DES is forwarding this correspondence to you to advise you that in accordance with RSA 482:12 and Env-Wr 502.02, an inspection of the subject dam was conducted on June 13, 2003. During this visual inspection and/or file review, the following deficiencies were observed:

There was an erosion path on the downstream face of the left embankment, parallel and adjacent to the spillway abutment wall. This had been indicated in the previous inspection report. It appeared that the area had improved since previous inspections either from natural re-growth or an attempt to re-vegetate the area;

The downstream left groin was wet with what appeared to be water running off the natural adjoining slope;

3 Brush at the left abutment to the left embankment is encroaching on the embankment;

4 On the upstream embankment, near the left groin of the embankment, brush and small tree growth was observed;

5 The fence on the upstream side of the left concrete abutment was missing, reportedly due to vandals, in several locations and on the crest of the concrete;

6 Riprap previously placed at the corner of the left upstream corner of the concrete training wall was well graded and appeared to be sufficiently reducing/limiting erosion in this area;

7 It was indicated that the brush downstream of the dam is maintained on a biannual basis and appeared to have limited growth on this inspection date;

8 Catwalk railings and steel ladders on the bridge deck need painting;

9. Efflorescence was noted in several locations along the horizontal seams in the overflow spillway The efflorescence appears to be similar to conditions as observed during the previous inspection;

10. Deteriorated concrete near the base of the left downstream concrete training wall, noted in a previous report, at the intersection of the far left ogee spillway had been previously patched with what appears to be a hydraulic cement. The patch appeared to be holding well and should be monitored for further deterioration;

    Standing water was observed at the base of the left overflow spillway with no noticeable flow possibly due to current weather conditions;

12. The low-level outlet pipe was flowing minimally to maintain minimum flow conditions downstream as was indicated by Mr. Cravens. The control stems to the low-level outlets appeared to be well maintained;

13. At the base of the 3rd monolith from the right side of the dam, which supports the low-level outlet pipe, the concrete was deteriorated within 12 inches from the base and 1 to 2 inches in depth;

14. Water was leaking through the natural rock abutments on the right side of the dam adjacent to the right overflow concrete spillway. The leakage appears to be caused from ground water conditions;

15. At the base construction joint of the 7th, 8th, and 9th ogee spillway monoliths the concrete was deteriorated and cracked with heavy efflorescence discoloration;

16. The concrete is deteriorated, at what appears to be a construction joint, near the top of the right concrete downstream retaining/training wall;

17. There was an overgrowth of trees within 10 feet on both sides of the right upstream security fence; and

18. The Emergency Action Plan (EAP) is due to be tested and updated.

DES believes that the above deficiencies can be corrected by performing the following items by the indicated schedule:

November 1, 2003:

1. Repair the erosion path on the downstream face of the left embankment, parallel and adjacent to the spillway abutment wall;

   Remove the brush and tree growth in the following locations:

   a. At the left abutment to the left embankment and 15 feet from the artificial embankment;
   b. On the upstream embankment near the left groin of the embankment. The brush and small tree growth should be maintained 15 feet from the artificial embankment within the groin;
   c. Within 10 feet on both sides of the right upstream security fence;

3. Replace and/or repair the fence on the left concrete abutment wall;

4. Paint the catwalk railings and steel ladders on the bridge deck;

5. Repair the concrete in the following locations;

   a. At the base of the 3rd monolith from the right side of the dam supporting the low-level outlet pipe;
   b. At the base construction joint of the 7th, 8th, and 9th ogee spillway monolith;
   c. At what appears to be a construction joint, near the top of the right concrete downstream retaining/training wall;

6. Update and test the EAP;

On a continuing basis:

7. Monitor the standing water observed at the base of the left overflow spillway;

8. Monitor the water leaking through the natural rock abutments on the right side of the dam;

9. Monitor water located in the groin of the left embankment; and

10. Monitor the areas of noted efflorescence for deteriorating concrete and repair as necessary.

DES is requesting that you complete and submit the attached "Intent to Complete Repairs" form, within 30 days of receipt of this letter, that will provide for correction of the identified deficiencies by the date(s) indicated above. Please call or write to our office if the repairs are completed ahead of the aforementioned schedule so that DES may schedule a follow-up inspection. Unless notified otherwise, DES will conduct the follow-up inspection on or after the date(s) indicated above. If you believe changes to the items of work or dates are necessary, please make the changes directly on the form and provide a brief explanation. Please call or write to our office if the repairs are completed before the aforementioned schedule. We have enclosed a self addressed stamped envelope for you to return this form.

DES has closed out the July 2001 LOD. Please refer to the closure letter and copy attached. DES would like to note that several of the deficiencies that were referenced in the 2001 LOD are also referenced in this LOD. DES appreciates the repair of a few of the previous deficiencies that have been addressed to date, however, we look forward to the completion of the deficiencies as outlined in this LOD. We cannot emphasis enough the importance of updating and testing your EAP. This dam is classified as a high hazard dam and the updates and tests should be conducted regularly. If you have any questions relative to updating or testing your EAP please contact Bethann McCarthy, our EAP Coordinator at 271-3406. She would be happy to answer any questions you might have.

Our intent in sending you this correspondence is to make you aware of items that DES believes warrant your attention to insure the continued safe operation of your dam. It is our hope that, through the submittal of the attached form and a commitment to keeping a well-maintained dam, you will voluntarily comply with the requested items of work. If we do not receive the intent form or a similarly adequate

written reply, we will assume that you are in agreement with our findings and recommendations and DES will carry out follow-up inspections accordingly.

If you have any questions or comments regarding this Letter of Deficiency or would like to be present at future inspections, please contact me at 271-3406, or write to the Water Division at the address listed on the top of the previous page.

Sincerely,

COPY

Dale F. Guinn, P.E.
Dam Safety Engineer

Attachments: DB8, DB13
cc: Gretchen Rule ✓
Bethann McCarthy, P.E., EAP Coordinator
Town of Madbury
Certified # 7000 1670 0000 0586 2404
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